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10/608,176	06/26/2003	Marc E. Mcfffe	H0004210	8222

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EXAMINER

LUONG, VINH

ART UNIT PAPER NUMBER

3682

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/608,176

Applicant(s)

MEFFE ET AL.

Examiner

Vinh T. Luong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 6, 25 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

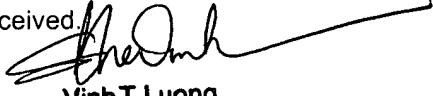
**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
Vinh T. Luong  
Primary Examiner

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/31/05</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

1. Applicant's election without traverse of group I and the species of Fig. 3 in the reply filed on January 11, 2006 is acknowledged.
2. Claims 6, 25, and 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and/or species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 11, 2006.
3. The drawings are objected to because: (a) the cross section, such as, Fig. 3 or 5 must be set out and draw to show all of the materials as they are shown in the view from which the cross section was taken. 37 CFR 1.84(h)(3). For example, the materials of the races 304 and 306 are required to be shown by proper hatchings; and (b) each part of the invention, e.g., the lubricant in claims 12, 13, and 22 should be designated by a referential numeral or character.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be

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notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed feature, such as, the lubrication in claims 12, 13, and 22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

5. The disclosure is objected to because of the following informalities: each part of the invention, e.g., the lubricant in claims 12, 13, and 22 should be designated by a referential numeral or character. Appropriate correction is required.

6. Claim 4 is objected to because of the following informalities: the claims contain grammatical or typographical error(s). For example, "a change in thickness" in claim 4 should have been changed to "a change in the thickness." Appropriate correction is required.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 12, 13, and 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 12, 13, and 22 claim the control system providing selective control of the control voltage to distribute the lubrication in the bearing. However, the drawings do not show, *inter alia*, the lubrication, the lubrication reservoir, the lubrication conduits, etc. and how the lubrication is distributed in the bearing. It is unclear as to how the control system controls the voltage to distribute the lubrication in the bearing as claimed.

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-5, 7, 8, 17-21, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Perni et al. (EP 1 134 443 A2 cited as reference X in the International Search Report disclosed by Applicant).

Regarding claim 1, Perni teaches a preload adjustment device, the device comprising:

a) a piezodynamic preload spacer 22, the piezodynamic preload spacer 22 coupled to a bearing 10 (Figs. 1, 6, and 7) in a momentum control device 2 (Fig. 1), the piezodynamic preload spacer 22 configured such that an application of a control voltage to the piezodynamic preload spacer 22 causes a change in a dimension of the piezodynamic preload spacer 22, and wherein the piezodynamic preload spacer 22 is configured such that a change in the dimension of the piezodynamic preload spacer 22 changes a preload of the bearing 10; and

b) a control system 4-6 (Fig. 8 and claims 1-14), the control system 4-6 providing selective control of the control voltage to selectively control the preload on the bearing 10. See paragraphs [0014], [0028]-[0033], and claims 1-14.

Regarding claim 2, the piezodynamic preload spacer 22 is located adjacent the bearing 10 (Figs. 1, 6, and 7).

Regarding claim 3, the bearing 10 comprises a duplex bearing pair 43 and 44 and wherein piezodynamic preload spacer 22 is located between the duplex bearing pair 43 and 44.

Regarding claim 4, the piezodynamic preload spacer 22 comprises a ring shaped spacer 22 having a thickness (Fig. 1), and wherein the application of the control voltage to the piezodynamic preload spacer 22 causes a change in the thickness.

Regarding claim 5, the piezodynamic preload spacer 22 comprises a piezoelectric material. See paragraph [0019].

Regarding claim 7, the momentum control device 2 comprises a reaction wheel 2 (Fig. 1).

Regarding claim 8, the momentum control device 2 comprises a control moment gyroscope 2.

Regarding claim 17, Perni teaches a preload adjustment device for adjusting preload in a duplex bearing 10 in a momentum control device 2, the duplex bearing 10 including a first bearing race 43 and a second bearing race 44 (Figs. 6 and 7), the preload adjustment device comprising:

a) a piezodynamic preload spacer 22, the piezodynamic preload spacer 22 coupled between the first bearing race 43 and the second bearing race 44, the piezodynamic preload spacer 22 configured such that an application of a control voltage to the piezodynamic preload spacer 22 causes a change in a dimension of the piezodynamic preload spacer 22, and wherein the piezodynamic preload spacer 22 is configured such that a change in the dimension of the piezodynamic preload spacer 22 changes the preload of the duplex bearing 10; and

b) a control system (Fig. 8), the control system providing selective control of the control voltage to selectively control the preload on the bearing 10.

Regarding claim 18, the piezodynamic preload spacer 22 comprises a ring shaped spacer 22 having a thickness, and the application of the control voltage to the piezodynamic preload spacer 22 causes a change in thickness.

Regarding claim 19, the control system inherently provides selective control of the control voltage to control the preload to compensate for changes in operating environment. See, *e.g.*, paragraphs [0011]-[0015] and claims 1-14.

Regarding claim 20, the control system inherently provides selective control of the control voltage to control the preload to compensate for wear in the bearing. See, *e.g.*, paragraphs [0011]-[0015] and claims 1-14.

Regarding claim 21, the control system inherently provides selective control of the control voltage to control the preload to compensate for thermal expansion in the bearing. See, *e.g.*, paragraph [0032].

Regarding claim 23, the control system inherently increases preload during a launch of the momentum control device 2 into space.

Regarding claim 24, the piezodynamic preload spacer 22 is inherently configured to provide an optimal operating preload for operating in space with a low control voltage and an increased preload with a high control voltage.

12. Claims 1 and 9-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kudo et al. (US Patent No. 6,286,374 B1).

Regarding claim 1, Kudo teaches a preload adjustment device, the device comprising:

a) a piezodynamic preload spacer 22, 23, the piezodynamic preload spacer 22, 23 coupled to a bearing 10 in a momentum control device 100, the piezodynamic preload spacer 22, 23 configured such that an application of a control voltage to the piezodynamic preload spacer 22, 23 causes a change in a dimension of the piezodynamic preload spacer 22, 23, and wherein the piezodynamic preload spacer 22, 23 is configured such that a change in the dimension of the piezodynamic preload spacer 22, 23 changes a preload of the bearing 10; and

b) a control system (Figs. 2 and 3), the control system providing selective control of the control voltage to selectively control the preload on the bearing 10. *Ibid.*, col. 6, line 18 through col. 10, line 35 and claims 1-14.

Regarding claim 9, the control system provides selective control of the control *voltage* to control the preload to compensate for changes in operating environment. See Kudo's Summary of the Invention and, *e.g.*, the matching transformer in Fig. 2.

Regarding claim 10, the control system provides selective control of the control *voltage* to control the preload to compensate for wear in the bearing 10. See, *e.g.*, the matching transformer in Fig. 2.

Regarding claim 11, the control system provides inherently selective control of the control *voltage* to control the preload to compensate for thermal expansion in the bearing 10. See, *e.g.*, the matching transformer in Fig. 2.

Regarding claim 12, the control system inherently provides selective control of the control *voltage* to distribute lubrication (*i.e.*, slippage) in the bearing 10. See col. 1, lines 11-21 and, *e.g.*, the matching transformer in Fig. 2.



Regarding claim 13, the control system (Figs. 2 and 3) inherently provides a varying control voltage to distribute the lubrication (*i.e.*, slippage) in the bearing 10.

Regarding claim 14, the control system inherently increases preload during a launch of the momentum control device 100 into space.

Regarding claim 15, the piezodynamic preload spacer 22, 23 is inherently configured to provide a reduced preload with a low control voltage and an increased preload with a high control voltage.

Regarding claim 16, the reduced preload inherently comprises an optimal operating preload (Fig. 3).

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. Claims 1-5, 7-11, 14-21, 23, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Fleury et al. (USP 6,505,968 B1 filed on February 16, 2000).

Regarding claim 1, Fleury teaches a preload adjustment device, the device comprising:

a) a piezodynamic preload spacer 208, 212, 305, 307, etc., the piezodynamic preload spacer 208, 212, 305, 307, etc. coupled to a bearing 205-207, 405-407, etc. in a momentum control device 200, 400, 800, 900, 1000, the piezodynamic preload spacer 208, 212, 305, 307, etc. configured such that an application of a control voltage to the piezodynamic preload spacer 208, 212, 305, 307, etc. causes a change in a dimension of the piezodynamic

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preload spacer 208, 212, 305, 307, etc., and wherein the piezodynamic preload spacer 208, 212, 305, 307, etc., is configured such that a change in the dimension of the piezodynamic preload spacer 208, 212, 305, 307, etc. changes a preload of the bearing 205-207, 405-407, etc.; and

b) a control system 600, the control system 600 providing selective control of the control voltage to selectively control the preload on the bearing 205-207, 405-407, etc. See abstract, col. 8, line 53 through col. 9, line 2, and claims 1-11.

Regarding claim 2, the piezodynamic preload spacer 208, 212, 305, 307, etc. is located adjacent the bearing 205-207, 405-407, etc.

Regarding claim 3, the bearing comprises a duplex bearing pair 906 and 907 and wherein piezodynamic preload spacer 904 is located between the duplex bearing pair 906 and 907. *Ibid*, col. 10, line 52 through col. 11, line 31.

Regarding claim 4, the piezodynamic preload spacer comprises a ring shaped spacer 804, 806 (Fig. 8) having a thickness, and wherein the application of the control voltage to the piezodynamic preload spacer 804, 806 causes a change in the thickness.

Regarding claim 5, the piezodynamic preload spacer comprises a piezoelectric material.

Regarding claim 7, the momentum control device comprises a reaction wheel 200, 400, 800, etc.

Regarding claim 8, the momentum control device 2 comprises a control moment gyroscope 200, 400, 800, etc.

Regarding claim 9, the control system provides selective control of the control *voltage* to control the preload to compensate for changes in operating environment. See abstract, background and summary of the invention, col. 8, line 53 through col. 9, line 2, and claims 1-11.

Regarding claim 10, the control system provides selective control of the control *voltage* to control the preload to compensate for wear in the bearing. See abstract, back ground and summary of the invention, col. 8, line 53 through col. 9, line 2, and claims 1-11.

Regarding claim 11, the control system provides inherently selective control of the control *voltage* to control the preload to compensate for thermal expansion in the bearing.

Regarding claim 14, the control system inherently increases preload during a launch of the momentum control device 100 into space.

Regarding claim 15, the piezodynamic preload spacer is inherently configured to provide a reduced preload with a low control voltage and an increased preload with a high control voltage.

Regarding claim 16, the reduced preload inherently comprises an optimal operating preload.

Regarding claims 17 and 18, see regarding claims 3 and 4 above.

Regarding claim 19, the control system inherently provides selective control of the control voltage to control the preload to compensate for changes in operating environment.

Regarding claim 20, the control system inherently provides selective control of the control voltage to control the preload to compensate for wear in the bearing.

Regarding claim 21, the control system inherently provides selective control of the control voltage to control the preload to compensate for thermal expansion in the bearing.

Regarding claim 23, the control system inherently increases preload during a launch of the momentum control device into space.

Regarding claim 24, the piezodynamic preload spacer is inherently configured to provide an optimal operating preload for operating in space with a low control voltage and an increased preload with a high control voltage.

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. Claims 12, 13, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleury in view of Karamata.

Regarding claims 12, 13, and 22, Fleury teaches the invention substantially as claimed. However, Fleury does not teach the control system to distribute lubrication in the bearing.

Karamata teaches the control system 25 in order to distribute lubrication in the bearing

27. See col. 6, lines 13-17.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the control system of Fleury in order to distribute lubrication in the bearing of Fleury as taught or suggested by Karamata.

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18. Claims 1 and 17 are rejected under 35 U.S.C. 102(e) as being *clearly* anticipated by Wu et al. (USP 6,422,757 B1 filed on December 15, 2000).

19. Claim 1 and 17 are rejected under 35 U.S.C. 102(b) as being *clearly* anticipated by Moseley et al. (USP 4,850,719).

See piezodynamic preload spacer 60 coupled between first and second bearing races 32 and 34, and control system described in col. 2, lines 13-24.

20. Claim 1 is rejected under 35 U.S.C. 102(b) as being *clearly* anticipated by Golz (EPO 0 377 145 cited by Applicant).

21. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

22. Claims 1-5, 7, 8, 17, and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, 8, 14, and 15 of copending Application No. 10608174 (hereinafter Appl.’174). Although the conflicting claims are not identical, they are not patentably distinct from each other because the two applications

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recite essentially same structures. In fact, Applicant apparently uses different terminology in order to claim essentially the same invention. *In re Griswold*, 150 USPQ 804 (CCPA 1966).

For example, see the comparison of claim 1 of this application and claim 1 of Appl.'174 below:

<u>Common</u>	<u>Appl.'174</u>	<u>Appl.'176</u>
a piezodynamic spacer		
a bearing		
	tuning system	control system

The control system claimed in this application inherently is the tuning system since when the control system selectively controls the preload on the bearing, it inherently absorbs the vibrations or *vice versa*. This fact is well known as seen, *e.g.*, US Patent No. 6,286,374 issued to Kudo, claim 11 of US Patent No. 6,505,968 issued to Fleury et al., and other references cited in the record. It would have been obvious to one having ordinary skill in the art to use the control system claimed in this application as the tuning system claimed in Appl.'174 or *vice versa* as taught or suggested by common knowledge in the art.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Karamata (control system), Okazaki et al. (control 6 for lubrication), and Lu et al. (bearing controls).

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinh T. Luong whose telephone number is 571-272-7109. The examiner can normally be reached on Monday - Thursday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Luong

March 9, 2006

A handwritten signature in black ink, appearing to read 'Vinh T. Luong', with a long horizontal flourish extending to the right.

**Vinh T. Luong**  
**Primary Examiner**